TCF-142-S, TCF-142-M

RS-232/422/485 to Fiber Converter User's Manual

Second Edition, December 2003

1. Overview

Introduction

The TCF-142 series converter is equipped with a multiple interface circuit that can handle RS-232, or RS-422/485 serial interfaces and multi-mode or single-mode fiber. TCF-142 converters are used to extend serial transmission distance up to 2 km (TCF-142-M multi-mode fiber) or up to 20 km (TCF-142-S single-mode fiber). RS-232 or RS-422/485 interfaces can't be used to convert to Fiber on the same TCF-142 at the same time.

Why convert serial to Fiber?

Fiber communication not only extends the communication distance, but also provides many good features as follows:

IMMUNE FROM ELECTRICAL INTERFERENCE: Fiber is not affected by electromagnetic interference or radio frequency interference. It provides a clean communication path and is immune to cross-talk.

INSULATION: Optical fiber is an insulator; the glass fiber eliminates the need for electric currents for the communication path.

SECURITY: Cannot be tapped by conventional electric means and is very difficult to tap onto optically. Furthermore, radio and satellite communication signals can easily be captured for decoding.

RELIABILITY & MAINTENANCE: Fiber is immune to adverse temperature and moisture conditions, does not corrode or lose its signal, and is not affected by short circuits, power surges, or static electricity.

Reverse Power Protection

The Reverse Power Protection feature provides extra protection against accidentally connecting the power cables to the wrong terminal. The converter is designed to automatically detect which power wire is positive and which is negative, and then adjust the power supply accordingly.

DIP Switch Selectable Terminator

For many products of this type, the termination resistor is set by a jumper located inside the product's casing, so that the user must open the casing to disable or change the resistor's strength. MOXA offers a better solution. TCF-142's terminator is set with a DIP Switch located on the outside of the converter's casing.

Auto Baud Rate Detection

TCF-142 incorporates a method for automatically detecting the serial signal's baud rate by hardware. This is an extremely convenient feature for the user. Even if a device's baud rate changes, the signal will still be transmitted through the converter without any problem.

2. Features

- Extend RS-232/422/485 transmission distance:
  - up to 20 km with Single mode—TCF-142-S
  - up to 2 km with Multi-mode—TCF-142-M
- Convert RS-232/422/485 signal:
  - to ST Single-mode fiber with TCF-142-S
  - to ST Multi-mode fiber with TCF-142-M
- Plug & Play
- Compact size
- Decrease signal interference
- Protect against electronic degradation/chemical corrosion
- Support baud rate up to 230.4 Kbps

3. Package Checklist

Before installing the Converter, verify that the package contains the following items:

Standard Accessory

- The RS-232/422/485 to Fiber Converter
- This User's Manual
- 7-contact terminal block connector x 1
- 3-contact terminal block connector x 1

* Notify your sales representative immediately if any of the above items is missing or damaged.

4. Dimensions and Appearance

Note: TCF-142 series are hot swappable.

- Wear a grounding device for electrostatic discharge.
- Install the media cable for network connection.

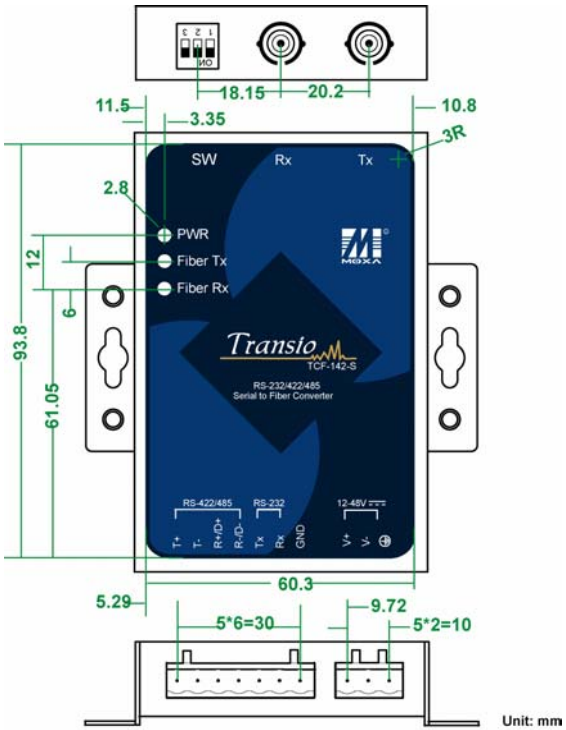


Fig. 1: TCF-142's dimensions and appearance

5. Wiring example:

Connecting the Power Supply

Before using the TCF-142, you need to connect the power supply. To do so, connect the power supply to the power supply terminal block located on the bottom side of TCF-142.

Note: TCF-142 uses a DC power supply.

Serial Device to PC

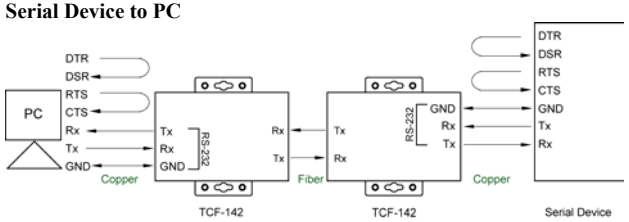


Fig. 2: Connecting RS-232 device and PC

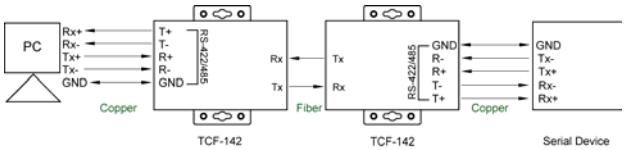


Fig. 3: Connecting RS-422 or 4-wire RS-485 device and PC

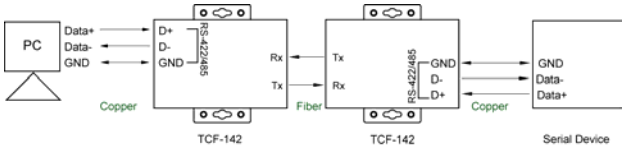


Fig. 4: Connecting 2-wire RS-485 device and PC

6. Switch Settings

There are 3 sets of DIP switches on the top of the TCF-142.

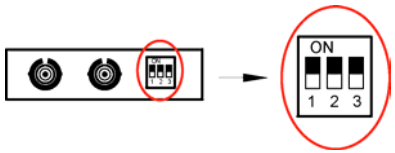


Fig. 5: DIP Switch position figure

Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	OFF	OFF
RS-485 4-wire	OFF	OFF
RS-485 2-wire	OFF	ON

Built-in 120 Ω Terminator	SW3
Enable	ON
Disable	OFF

7. LED Description

LED	Color	Function
PWR	Red	Steady ON: Power is ON
Fiber Tx	Green	Blinking when fiber is transmitting data
Fiber Rx	Orange	Blinking when fiber is receiving data

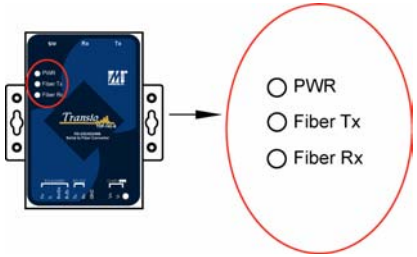
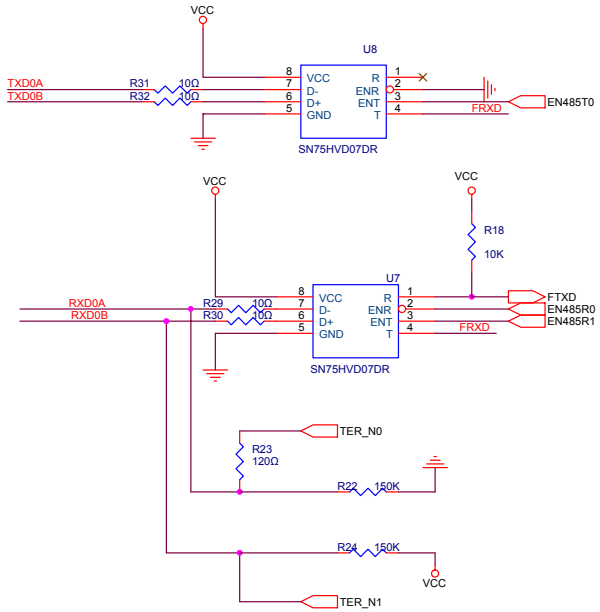


Fig. 6: LED position figure

8. RS-422/485 circuit diagram



9. Specifications

Model Name	TCF-142-S, TCF-142-M
Serial Communication	
Signals for RS-232	TxD, RxD, SGND
Signals for RS-422	TxD+, TxD-, RxD+, RxD-, SGND
Signals for 4-wire RS-485	TxD+, TxD-, RxD+, RxD-, SGND
Signals for 2-wire RS-485	Data+, Data-, SGND
Baud Rate	300 bps to 230.4 Kbps
Surge protection	15 KV ESD

Fiber Communication	
Connector type	ST
Distance	TCF-142-S: Single mode fiber for 20 km TCF-142-M: Multi mode fiber for 2 km
Support Cable	TCF-142-S: 8.3/125, 8.7/125, 9/125 or 10/125µm TCF-142-M: 50/125, 62.5/125, or 100/140 µm
Wave length	TCF-142-S: 1310 nm TCF-142-M: 820 nm
Min.TX Output	TCF-142-S: -9dBm TCF-142-M: -16 dBm
Max.TX Output	TCF-142-S: -6 dBm TCF-142-M: -7 dBm
Environment	
Operating Temperature	0 - 60°C (32 - 142°F), 5 to 95 % RH
Storage Temperature	-20 – 85°C (-4 - 185°F), 5 to 95 % RH
Power	
Input Power Voltage	12 – 48 VDC
Power Line Protection	1 KV Burst (EFT), EN61000-4-4 1 KV Surge, EN61000-4-5
Reverse Power Protection	Protects against V+/V- reversal
Over Current Protection	Protects against 2 signals shorted together: 1.1A
Power Consumption	TCF-142-M: 70mA at 12 VDC TCF-142-S: 145 mA at 12 VDC
Mechanical	
Dimensions (WxDxH)	67 x 100 x 22 mm 90 x 100 x 22 mm (including ears)
Material	Aluminum (1 mm)
Gross Weight	TCF-142-S: 140g TCF-142-M: 140g
Regulatory Approvals	
CE	Class B
FCC	Part 15 sub Class B
EMI	EN55022 1998, Class B
EMS	EN61000-4-2 (ESD), Criteria A, Level 2 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 2 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2
Free fall	IEC 60068-2-32

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